

Claims:

1. A security substrate comprising at least one oriented, high melt-strength polypropylene foam layer and at least one security element.

2. The security substrate of claim 1 wherein said security element is a visual security element.

3. The security substrate of claim 2 wherein said visual security element is selected from the group of printed indicia, reverse printing, color shifting, metamerism, polarizing, fluorescent, luminescent, phosphorescent, pearlescent, holographic, reflective, metallic, magnetic films, threads, particles or fibers; watermarks, embossments, transparent or translucent regions, liquid crystals; holograms, optical lenses, microlenses, Fresnel lenses, optical filters, polarizing filters, and reflective elements; photochromic elements, thermochromic elements, liquid crystals, Moiré patterns, refractive, lenticular and transparent grids, embossed elements or other three-dimensional elements, reverse printing, watermarks; and color-shifting, metamerism, polarizing, fluorescent, phosphorescent, pearlescent inks; and combinations of the above.

4. The security substrate of claim 1 wherein said security element is an embossment.

5. The security element of claim 4 wherein said embossment provides a substantially transparent region.

6. A multilayer article comprising the foam layer of claim 1 and at least one thermoplastic film layer.

7. The multilayer article of claim 6 wherein said security element is integral to said thermoplastic film layer.

8. The multilayer article of claim 6 wherein said security element is integral to said foam layer.

9. The multilayer article of claim 6 wherein said security element is selected from the group of printed indicia, reverse printing, color shifting, metamerism, polarizing, fluorescent, luminescent, phosphorescent, pearlescent, holographic, reflective, metallic, magnetic films, threads, particles or fibers; watermarks, embossments, transparent or translucent regions, liquid crystals; holograms, optical lenses, microlenses, Fresnel lenses, optical filters, polarizing filters, and reflective elements; photochromic elements, thermochromic elements, liquid crystals, Moiré patterns, embossed images or other three-dimensional elements, reverse printing, watermarks and color-shifting, metamerism, polarizing, fluorescent, phosphorescent, pearlescent or magnetic inks; and combinations of the above.

10. The multilayer article of claim 6 wherein said security element is revealed through a substantially transparent region in said foam layer.

11. The multilayer article of claim 6 comprising at least two security elements, which in registration, provide a visual security element.

12. The multilayer article of claim 11 wherein said security element is a polarizing element or a Moiré pattern.

13. The security substrate of claim 6, wherein said security element comprises at least one core embedded in the thermoplastic film layer.

14. The security substrate of claim 6 wherein said security element comprises a plurality of laterally spaced cores embedded in the thermoplastic film layer.

15. The security element of claim 13 wherein said core comprises a thermoplastic polymer having dyes or pigments, or color shifting, polarizing, fluorescent, luminescent, phosphorescent, reflective, metallic, or magnetic particles dissolved or dispersed therein.

16. The security substrate of claim 13, wherein said core comprises a colored, phosphorescent, pearlescent or fluorescent polymer.

17. The substrate of claim 13 wherein said security element is coextruded with said foam layer by an inclusion coextrusion process.

18. The substrate of claim 13 wherein said security element is coextruded with said film layer by an inclusion coextrusion process.

19. The substrate of claim 6 having two high melt-strength, oriented polymer foam layers and a thermoplastic film layer disposed therebetween.

20. The substrate of claim 6 wherein said thermoplastic film layer is coextruded with said foam layer.

21. The substrate of claim 6 wherein said thermoplastic film layer is laminated to said foam layer.

22. The substrate of claim 6 wherein said thermoplastic film layer is oriented.

23. The substrate of claim 6 wherein said thermoplastic film layer is unoriented.

24. The multilayer substrate of claim 6 comprising said thermoplastic film layer and said high melt strength foam layer having a bending stiffness of at least 40 Newtons.

25. The substrate of claim 1 wherein the high melt-strength polymer has a melt strength of 25 to 60 cN at 190°C.

26. The substrate of claim 1 wherein said orientation is biaxial.

27. The substrate of claim 1 wherein said polymer is a high melt-strength polypropylene comprising homo- and copolymers containing 50 weight percent or more propylene monomer units.

5 28. The substrate of claim 27 wherein said polypropylene copolymers are selected from random, block, and grafted copolymers of propylene and an α -olefin selected from the group consisting of C3-C8 α -olefins and C4-C10 dienes.

10 29. The substrate of claim 1 wherein said high melt strength polypropylene comprises a blend of a major amount of said high melt strength polypropylene and a minor amount of an additional semicrystalline or amorphous polymer.

30. The substrate of claim 1 comprising a security element on a surface of said foam layer.

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31. The substrate of claim 1 comprising a security element dispersed in said foam layer.

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32. The substrate of claim 1 wherein said security element is laminated to said foam layer.

33. A security document comprising the substrate of claim 1.